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ABSTRACT

This annual report examines the accomplishments during 1970 of three programs. The first program was to improve the organizational and administrative environment for teaching. Its subsidiary projects were 1) the organizational context of teaching; 2) professional socialization of the teacher; 3) attitudes of teachers toward their occupation; 4) case studies of the teacher's role in traditional and innovative elementary schools; 5) organizational change; 6) the teacher in the authority structure; 7) the social context of teacher-student relations; and 8) characteristics of effective teachers and the distribution of teacher services. The second program's objective was to improve the effectiveness of teachers in motivating, engaging, and fostering the achievement of students from low income areas. The projects were 1) educational community organization; 2) teacher training--standard English as a second dialect; 3) developing problem-solving skills through students teaching students; 4) teacher training programs for disadvantaged schools; and 5) the impact of educational technology. The objective of the third program was to define, analyze, and develop means for promoting heuristic teaching and learning. Its projects were 1) training studies; 2) microteaching and intern data bank; 3) uncertainty studies; 4) personal competencies; and 5) reinforcement or achievement behaviors in disadvantaged children. (NBM)

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Accomplishments '70

Stanford Center for Research and Development in Teaching

SCHOOL OF EDUCATION STANFORD UNIVERSITY

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Preface

This Center is one of a system of eight Educational Research and Development Centers funded under the Cooperative Research Act (as amended by Title IV of the Elementary and Secondary Education Act of 1965). The Center program was organized as one response to an increased national awareness of the importance of finding solutions to critical educational problems.

The Center is concerned with the shortcomings of teaching in American schools: the ineffectiveness of many American teachers in promoting achievement of higher cognitive objectives, in engaging their students in the tasks of school learning, and, especially, in serving the needs of students from low-income areas. Of equal concern is the inadequacy of American schools as environments fostering the teachers' own motivations, skills, and professionalism.

The Center employs the resources of the behavioral sciences — theoretical and methodological — in seeking and applying knowledge basic to achievement of its objectives. Analysis of the Center's problem area has resulted in three programs: Heuristic Teaching, Teaching Students from Low-Income Areas, and the Environment for Teaching. Drawing primarily upon psychology and sociology, and also upon economics, political science, and anthropology, the Center has formulated integrated programs of research, development, demonstration, and dissemination in these three areas. In the Heuristic Teaching area, the strategy is to develop a model teacher training system integrating components that dependably enhance teaching skill. In the program on Teaching Students from Low-Income Areas, the strategy is to develop materials and procedures for engaging and motivating such students and their teachers. In the program on Environment for Teaching, the strategy is to develop patterns of school organization and teacher evaluation that will help teachers function more professionally, at higher levels of morale and commitment.

The report which follows was prepared as part of the Program Plan and Budget Request submitted to the National Center for Educational Research and Development, U.S. Office of Education, in support of the Center's request for funding for Fiscal Year 1971. In response to a suggestion from the NCERD coordinator responsible for monitoring the Center's operation, the report is being distributed in printed form in order to make a wider audience aware of the Center's objectives, accomplishments, and assessment of those accomplishments during 1970. The three-column format follows that originally suggested by NCERD.

N. L. GAGE
Acting Director

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Program 03: The Environment for Teaching

PROGRAM OBJECTIVE:

To improve the organizational and administrative environment for teaching.

1970 OBJECTIVES

This program deals with the effects on teaching and learning of social and physical settings in the classroom, the school, and the community. Independent variables being studied are those that arise in such processes as teacher evaluation, educational innovation, collegial interaction, and from the social-class composition of teacher and student populations, the educational and occupational aspirations and expectations of students, and the academic profiles of teachers. The dependent variables are various aspects of the teacher's role.

Two primary lines of investigation were being pursued: (a) structural and operational mechanisms, such as the openness or closedness of classrooms and the distribution of authority rights in schools; (b) characteristics of schools and of student and teacher populations and their relationships to students' aspirations and teachers' perceptions of student abilities, the ability level of teachers, and the ways teachers are socialized.

1970 ACCOMPLISHMENTS

The program has developed findings concerning the impact of various organizational characteristics on teachers and teaching. Theoretical frameworks for examining such characteristics and their impacts have been tested empirically. Decision-making efficiency in teaching teams; the socialization of teachers, especially new ones and especially as to their autonomy; the attitudes of teachers toward their occupation; the teacher's role as seen from an anthropological perspective; the teacher's involvement in organizational change and innovation; the political theory of policy formulation in schools as it might apply to the problem of changing teachers' roles and evaluating teachers; the teacher's position in the school's authority structure and the shortcomings and effects of present-day provisions for evaluation of the teacher's work — all these have been studied through a variety of interview, questionnaire, and observational methods.

ASSESSMENT OF 1970 ACCOMPLISHMENTS

The program has moved substantially into a position of readiness to plan and, in about two years, to field test experimentally some new organizational arrangements that will solve the long-standing problem of teacher evaluation. The problems, which are those of making the evaluations valid, acceptable to teachers, and feasible for administrators, should be attacked soon if the program is adequately supported. This planning is drawing upon the experience and findings of the past two years (i.e., since the present program was initiated) so as to show not merely what new arrangements for teacher evaluation, staffing, and school organization should be tried but, equally important, how such innovations in organization can be made viable in view of present-day resistances to change in the delicate balances of authority and collegial relationship in schools. The proposed changes will need to meet stringent tests of their acceptability to teachers and administrators and of their beneficial effect on teacher-student interaction.

Project 0302: The Organizational Context of Teaching

To compare the decision-making efficiency of elementary school teaching teams and ad hoc groups of classroom teachers as well as individual teachers, data on interaction within groups engaged in the decision process were obtained. The effect of the presence or absence of an appointed leader, experience in working as a group, and size of group was assessed.

Performance with respect to specific tasks engaged in with colleagues is not affected by the team's administrative structure. Collegial association as against a predetermined hierarchy within a team-teaching arrangement made no significant difference in the decision behavior. Groups took longer than individuals to complete problems. Among groups there were greater extremes in the rating of consequences of alternative courses of teacher action on a teacher problem.

Apparently, generalizations from small group research may apply to teaching work groups in general, since teaching teams and ad hoc groups differed little. Assumptions regarding the superiority of team decisions appear unwarranted. Team size and type of leadership may be important. A Technical Report by Barbara D. Lopossa, "A Comparative Study of Team and Individual Decision Making," is undergoing outside review preparatory to final editing and publication. This project has been completed and its results are being incorporated into the planning for Program 03.

Project 0303: Professional Socialization of the Teacher

To study the socialization experience of beginning teachers in a single school district (N = 650), especially as to changes in autonomy attitudes, an Autonomy Attitudes Inventory was administered before the 1967 school year and six months later; also interviews with all 106 new teachers were conducted in May and June to identify each new teacher's "significant other" and to measure his behavioral autonomy and job satisfaction.

The data suggest that autonomy is task-specific and more a function of the teacher's personal experience, reputation, and subject-matter based prestige than by demand. Organizational evaluation is significant for professional socialization, demands for autonomy often clash with superiors' attitudes, satisfaction with teaching relates to satisfaction with task allocation and evaluation, personal liking between teachers and their evaluators is significant for socialization, and new teachers want more control and guidance in the discipline and clerical-task areas and more autonomy in the areas of curriculum content and teaching method.

The nature of specific work tasks and teaching as a profession need more research emphasis than general value orientations. The Autonomy Attitudes Inventory discriminates well between groups of teachers. The evaluation of beginning teachers needs to be examined more closely in terms of the questions, Who should do it? How can it be made acceptable? How do evaluators affect professional attitudes, instability within the organization, and attrition rates of beginning teachers? It may be desirable deliberately to structure evaluation patterns in order to change teacher behavior. New teachers should perhaps choose their own supervising teacher, who would be paid to evaluate their teaching. This arrangement would take advantage of both "power" (ability to sanction) and "affect" (liking for the evaluator) in socializing

new teachers. Technical Report No. 12 by D. E. Edgar and R. L. Brod, "Professional Socialization and Teacher Autonomy," summarizes the completed study.

Project 0304: Attitudes of Teachers Toward Their Occupation

To develop six scales to measure the attitudes of teachers toward job security, financial reward, social contributions, status, creativity, and conformity as dimensions of the occupation of teaching, an inventory was administered to the teachers studied in Project 0303. Each of the six scales was intended to be based on a prevalent sociocultural value, have sufficient internal consistency to discriminate between small groups, and be fairly uncorrelated with the others. The 60 items were put in random order with a 4-point agree-disagree scale.

Internal consistency coefficients ranged from .80 to .93. Analyses of variance attributable to age, sex, marital status, and years of teaching experience supported the construct validity of the scales.

The instrument could be used in predicting which teachers will remain in the occupation, in distinguishing the occupational character profiles typical of various occupational groups and thus in planning vocational education, in studying the effects of various educational programs such as team teaching or flexible scheduling, and in studying the effects of teacher training programs on trainees' attitudes, according to different grade levels, curricula structures, kinds of communities, etc. A Technical Report is currently undergoing review as to its publishability.

Project 0305: Case Studies of the Teacher's Role in Traditional and Innovative Elementary Schools

To compare the role of the elementary teacher in traditional and innovative schools, the investigator carried out participant observation supplemented by interviews, questionnaires, and other techniques. The initial phase consisted of a case study of a traditional elementary school to provide base-line data against which to analyze an innovative school, to develop a holistic picture of the teaching experience in an elementary school, and to develop hypotheses for subsequent studies.

Preliminary analysis of the data portrays the school as a cultural system under strain, coping only haphazardly with internally and externally induced value conflicts. The conflicts appear to be integral to the teaching experience, but the system functions inadequately in helping the teacher resolve these conflicts. Hence, the teacher must develop her own adaptive responses to the ideological, organizational, and interpersonal levels of her occupational experience.

A conceptualization of the teaching experience is emerging; it includes a typology of "teacher encounters" for use in ethnographic studies of a teaching experience. The latter work has been reported in Research and Development Memorandum No. 45 by Richard L. Warren, "Teacher Encounters: A Typology for Ethnographic Research on the Teaching Experience," March 1969.

Project 0306: Organizational Change: The Study of Innovations in Educational Institutions

The earlier stage of this project involved a series of studies of 50 changes in high schools designed to explore several current theoretical propositions as to the important variables and causal relations in the educational change process.

In its later phase, a political model of educational policy formulation is being used to study the policy-forming mechanisms of universities, colleges, and schools—especially the structural and organizational factors that promote or hinder policy changes and the governance processes that frame and support teaching, and the strategies for changing teacher education institutions. The model contains social structure, interest, articulation, and legislative elements. Beginning with formal structures and informal groups, proceeding to resultant demands for action, which generate partisan pressure and, eventually, official policy, the cycle eventuates in a new set of tensions and demands. The present study focuses more closely on the role of environmental factors in determining university policies—the influence of outside pressure groups, of ties to the state legislature, of competition with other universities. Several major policy changes will be investigated as to the internal and external factors associated with those changes. The conceptual framework was to be refined, a specific set of problems was to be identified, techniques for field research were to be formulated, and pretests of instruments and a sampling of universities were to be carried out.

Twenty changes in high school programs—content and structural changes—were identified. One-fourth of the changes were in each of four phases: (a) the interest phase, (b) the decision phase, (c) the first-use phase, and (d) the continued-use phase. Data were collected in 12 medium and large high schools in the San Francisco Bay Area for each of the two types of change (content or structure) and the four phases of change (interest, decision, first use, or continued use), and also on school size, economic resources of the school, subject matter of the change (science or humanities), external or internal origin of the change, and the number of persons involved in using the change. The total sample consisted of 50 changes. Interviews and questionnaires indicated that (a) teachers' militance is influenced by their perceptions of the school's structural openness and the teachers' initiative; (b) the major actors in the change process had certain kinds of interactions, sources of information, views of the change, and pressure techniques; (c) an individual's participation in a change was uncorrelated with his feelings that change was appropriate or that he had accomplished something; (d) the more innovative teachers and administrators tended to be male, older, better educated, and more cosmopolitan—but these characteristics accounted for little variance in innovativeness among teachers; (e) department heads were seen as middle-level managers in schools with elected rather than appointed heads, such schools also having better communication regarding change be-

The findings cited in column two represent the highlights of the studies thus far completed in the first phase of the project. The findings will be summarized in detail in a monograph which will contrast the different theoretical views of the change process represented by the various studies and provide tests of these views using the data on identical changes.

In the second phase, the task of constructing the political theory of policy formulation has been virtually completed. Writing is now in process on (a) the analysis of organizational change: human relations versus a political systems approach; (b) social science paradigms and organizational theory; (c) models of university governance: bureaucratic, collegial, and political; and (d) a political analysis of academic governance. The major outcome of the project is a basis for analyzing the influence of teachers on curriculum innovation and the role of participants in a wide variety of educational policy decisions. These studies will contribute to the program's overall work on the design of materials and systems for the improvement of the organizational and administrative context of teaching.

tween teachers, administrators, and department heads.

Further, the political theory of organizational policy formulation was completed in preliminary form. This theory seeks to explain how critical education policies are set and how teachers and other participants influence those policies. It was found that, when an educational system has diffuse goals, high penetration of external influence, low task interdependence, and high professionalism, a political rather than a bureaucratic decision model is more useful.

Project 0307: The Teacher in the Authority Structure

Study A: Status Orientation of Teachers and Their Professional Behavior

To compare the status and roles of teaching-team teachers in physically open schools with those of teachers in traditional schools, questionnaire data on about 230 teachers in nine open and seven traditional schools, along with field observations in a more intensive study of three open schools, were to be analyzed. More specifically, the objectives were to see how interaction, authority, and evaluation patterns of teachers are changed by the open school, to see whether open schools offer more satisfying opportunities for larger-scale activity to more ambitious teachers, and to see whether open-school structures are more satisfying to teachers who are oriented toward students in more professional terms.

It was found that teachers in open schools, as compared with those in traditional schools, were more satisfied with their jobs, felt more autonomous, reported more influence in making decisions, saw their principals as less influential—none of these influences being attributable to the sex or education of the teachers. More ambitious teachers were more frequent in the open-school setting and tended to be more satisfied with their jobs. Teachers' orientations toward children on a maternal, or child-development dimension were unrelated to their happiness in the open schools, contrary to hypothesis, because teachers in open schools were more satisfied overall, and satisfaction was more frequent among teachers with a maternal orientation.

The 1970 accomplishments accorded well with objectives. Nonetheless, the need to observe small-group interaction in teaching teams emerged. Such observations have been made and will be used to test the hypothesis that teachers who report greater autonomy and efficiency in the school are more active in team meetings. The project contributed knowledge about the effects of building schools according to the open-space design now being used in about 50% of new elementary schools. It also improved understanding of the increasingly prevalent differentiated staffing arrangements in schools. The findings will lead to the development of empirical bases for helping school administrators choose the open-space design and differentiated-staff patterns. The study's instruments are useful for describing teacher influence in different organizational settings, including differentiated staffing.

Studies B-E: The Evaluation of Teacher's Work

To study the evaluation process, considered central to control, in schools—the allocation of tasks to teachers, criterion setting, the sampling of performances or outcomes, the appraisal of teachers, how these activities are carried out, and how the distribution of authority rights is found to vary as a function of the type of teaching task—a large-scale field study using both interviews and questionnaires was to be conducted.

The objective of a second study, on the evaluation of university and college teachers, was to sample a diverse group of universities and colleges in order to extend findings in a study of Stanford faculty members—a study that dealt with authority and evaluation among Stanford faculty.

The objective of a third study was to finish pilot testing a research instrument that would be useful in reconceptualizing the meaning of "professional" as applied to teachers, to administer the instrument to a large number of teachers in a variety of types of schools, and to analyze and report the resulting data.

A questionnaire for studying the evaluation of teachers, one as satisfactory as the previous time-consuming interview schedule, was given to 131 teachers in a school system. A first report on the data was presented to the superintendent of the district and to the teachers' committee on evaluation. A combined questionnaire and interview schedule for school administrators was developed to obtain data on the communication of organizational goals and criteria for evaluating the effectiveness of performance. Two new school districts have agreed to have their teachers studied next year; of these, one has 850 teachers and the largest minority enrollment between Los Angeles and San Francisco, along with many teachers who are members of minority groups. A book-length manuscript on the general theory of authority and evaluation has been delayed.

The studies of the evaluation of university and college teachers were not carried out; that is, no studies were made in new institutions. Effort was devoted solely to the preparation of the monograph on the study of the Stanford faculty. A monograph on the evaluation of university teachers has been delayed.

Detailed analyses of the questionnaire data from the teachers in the first system have been prepared for the computer and for intensive cross-tabulational analysis. Preliminary results indicate that "record-keeping" and "maintaining control" are tasks that have higher predictability, higher efficacy, higher clarity, and lower autonomy than more professional tasks, namely, "teaching subject matter" and "teaching character development." About half of all teachers had no idea what criteria are used to evaluate

When completed and reported, analysis of the data of Studies B-E should lay the basis for the development of more adequate and acceptable approaches to the evaluation, control, and professionalization of teaching in the public schools.

them. Teachers were very dissatisfied about these aspects of the evaluation process, rated evaluation as less helpful than their previous formal training, which in turn was rated less helpful than their experience as teachers, and perceived that they are not evaluated frequently enough.

Project 0308: The Social Context of Teacher-Student Relations

Study A: A Study of Family and School Effects on Student Aspirations

The objective was to reveal the effects of parent goals, school climate, and student and counselor perceptions on the educational aspirations and plans of tenth-grade boys, by analyzing questionnaire data from eight schools. The plan was then to focus on the guidance counselor's perceptions of students — the organization of factors which affect them, and the impact of these perceptions on students. A further objective was to study the social-class characteristics of students and of schools that affect the ways in which counselors see students. The studies also have methodological objectives—developing techniques to disentangle the effects of organizational structures from those of variations among types of individuals which those structures select.

A final report (Paul Wallin, S. K. Geisinger, and Freda B. Wallin, "Family and School Influence on the Educational Goals of Working-Class and Middle-Class Tenth-Grade Boys") indicated that social-class composition of schools was unrelated to the boys' educational goals. Given high aspirations, boys were more likely to set high goals when they perceived their aspirations to be realistic, or feasible. But high aspirations, intensely held, could override a low perceived feasibility of realizing them. The more positive the parent-son relationship, the greater the concordance between parents' and sons' aspirations. Parents of all social classes were likely to have high educational aspirations for their sons. The positive correlation between parents' goals and their social-class position can be attributed to class differences affecting their perceptions of the feasibility of fulfilling their high aspirations for their sons. Boys and their parents agreed in reporting on factual items regarding home and family but diverged in reporting on parents' education and occupation and on attitudes of parents and attitudes of their sons. Before moving to where they now

The findings contribute to the understanding of goals as a function of (a) aspirations and (b) the perceived feasibility of obtaining the goals. The finding that school has little influence on students' educational goals — and on the goals the parents set for their sons — suggests that teachers and counselors interested in raising the educational goals of less privileged students should seek to inform students of the value of a college education and persuade both students and parents of the academic and economic feasibility of such an education. (Because of the sharpened focus of Program 03, so that, briefly stated, it will now concentrate on studies in which teachers are explicitly involved, Project 0308 will not be continued as part of the Center's program. This decision was made despite the significance of the project for educational processes beyond the Center's focus.)

live, few parents, whether middle- or working-class, apparently considered the quality of the school system in the area. Parents' estimates of their sons' academic ability were considerably higher than the estimates of the school counselors.

Study B: Occupational Prestige Perceptions and Adolescents' Aspirations

The objectives were to determine whether the occupational and educational aspirations of high school students are influenced by their perceptions of occupational prestige, and whether information about occupations at different status levels affects these perceptions of prestige, to see whether teachers and counselors could modify adolescent aspirations by manipulating sources of information about jobs. Adolescents were to be observed, prior to and following a shift in the socioeconomic composition of their school classes, to ascertain whether major changes occurred in their perceptions and aspirations. In the fall of 1969, approximately 6,000 questionnaires were to be administered to youngsters just entering eight high schools, and a similar questionnaire was to be administered to 6,000 seniors at the same time or in the spring of 1970. The data on entering students would be analyzed to determine whether sophomore students' perceptions of occupational status were related to the socioeconomic status of their family and the junior high school from which they came and also to their aspiration levels and estimates of ability and education required for job attainment. Data from the seniors would be analyzed to

In the spring of 1970, approximately 3,500 questionnaires were administered to ninth- and twelfth-grade students in four high schools. The data are being placed on computer tape preparatory to analysis. A report on the findings is expected in the fall of 1970.

The project was delayed because obtaining the sample of appropriate schools required more time than had been expected. The sample was smaller than planned because teachers resisted the use of the questionnaires out of disaffection with the school district's research office. The sample of students was also reduced in size owing to much higher nonattendance rates of students than was previously known, and owing to some resistance to the questionnaire on the part of students. Despite these difficulties, it is anticipated that the data will yield significant advances toward the study's objectives, which are profoundly important to an understanding of school effects on adolescents' aspirations. (Center support of this study has also been discontinued, because of the sharpened focus of Program 03, as explained above for Study A.)

determine the effects of high school status in changing prestige perceptions and aspirations. Further, the data would permit resolution of the controversy concerning the causal nature of the association between school socioeconomic composition and the aspirations of adolescents in the school system. Junior high school students similar in socioeconomic residential backgrounds and aspiration levels would be observed as they moved into senior high schools that differed in socioeconomic composition. The extent to which those who move into an upper-status high school raise their aspirations above those who move into the lower-status high schools would then be determined.

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Study C: School Effects on Student Educational and Occupational Plans

The objective was to distinguish school resources (e.g., average social status of the students in a school, average ability level of the students, quality of the teachers, availability of special services) which add to the students' aspirations and capabilities from those which add to the standards against which he and others measure himself.

First, a multivariate analysis of 35,000 seniors in 518 high schools in 1955 had led to a research report which was to be revised and completed by the end of FY 1969.

Second, a contextual panel of 946 students in 99 American colleges, 1962-65, was to be continued. A final report on the first phase of the study was to be completed by the first quarter of FY 1970. Further data analyses were

R&D Memorandum No. 65, "The Charter: Conditions of Diffuse Socialization in Schools," by John W. Meyer was published in May 1970. (Also in W. R. Scott (Ed.), *Social Processes and Social Structures,* New York: Holt, Rinehart and Winston, 1970.) The major conclusions were that schools are more likely to create broad changes in their students when they are (a) located in societies which have broadly or diffusely defined elites and (b) "chartered" or licensed to confer entry into these elites.

These findings apply to the controversy concerning the effects of the separation (through tracking or other means) of groups of varying social status and ability within school systems. It indicates that such separation can have negative effects on students' aspirations. For re-

The findings may explain the fact that American schools have relatively small effects on student values in terms of the fact that American society does not have diffusely defined elites. A second application is to question whether isolated or "total" educational settings are necessary for effecting broad changes in students; this necessity arises only if such broad changes are not routinely included in the school's social charter, or right to allocate students.

R&D Memorandum No. 62, "High School Effects on College Intentions," by John W. Meyer, was published in February 1970. (Also in *American Journal of Sociology,* 1970, **76** (1), in press.) This study showed that the social status of a high school affects the college intentions of its students, over and above the effects of family

to be made, especially to study student-teacher relations (as indicated by supportiveness and grading practices) as variables intervening between school characteristics, on the one hand, and student self-esteem and occupational choice, on the other.

Third, data from Coleman, et al., *Equality of Educational Opportunity*, had been obtained and were to be analyzed in FY 1970 to see how contextual effects have changed as a result of the substantial changes since 1955 in the American educational system. A report was to be written during the final quarter of the year.

search on teaching it means that such separation of students within schools can negate the efforts of teachers to raise students' aspirations.

The study of college effects was completed. In its final phase, this study was supported by SCRDT. (John W. Meyer, "The Effects of College Size and Quality on Student Occupational Choice," will be published as an R&D Memorandum.) Neither college quality nor college size affected the social status or academic character of the occupational aspirations of the students. Smaller colleges produced more students who go into academic professions and fewer students who go into such professions as medicine, law, and engineering, even when the known occupational preferences of the students as freshmen were held constant.

The Coleman Report data have been acquired and organized for computer analysis. They will be examined to make possible more detailed analyses of more recent high school effects, in particular, the effects of a variety of attributes of the teachers in the school sample.

status and individual ability. This effect was not attributable to the formal features of the school organization. It also masks a negative effect in that, in schools with students of higher than average ability, students of any given ability and status are *less* likely to have college intentions.

This study bears on the practical question of the educational benefits and disadvantages of smaller colleges and affects the work of teachers in suggesting that the greater opportunities in small colleges for identification and interaction with teachers (who are academics) may affect students' occupational aspirations.

(Center support of this study has also been discontinued, because of the sharpened focus of Program 03, as explained above for Study A.)

Project 0309: Characteristics of Effective Teachers and the Distribution of Teacher Services

To design policy-oriented models that might yield information helpful in improving the efficiency and effectiveness of schools, a mathematical model was to be derived. It would approximate a set of plausible educational relationships, and the mathematical equations would be estimated statistically for a set of relevant data. The resulting set of input-output relations were to be combined with information

The mathematical model of the educational production process, incorporating student attitudes and cognitive measures as outputs, was developed. The model took the form of a set of simultaneous linear equations where school inputs were classified according to student characteristics, teacher characteristics, school facilities, and other inputs. Estimates yielded by the system of equations suggested that student

The project has attained most of its objectives for the current year. Its results have major implications for the optimization of educational expenditures in effecting important educational outcomes. Better estimates of the equations are being sought through refinement of both the data and the model. Statistical estimates of the system are being compared with results derived from another approach, mathematical program-

on the prices of inputs in order to suggest the best strategies for improving the schools.

The project was intended to improve on the single-equation approach to the evaluation of input-output relations in education. The proposed model would take a simultaneous-equations approach to solving for school outputs. There would be a single equation showing how students' socioeconomic status, teachers, fellow students, and other student characteristics are related to each of the following: student verbal scores, sense of efficacy, grade aspiration, and parents' attitudes. Then the four equations would be solved.

The raw data to be used had been obtained from several thousand sixth graders attending some 35 schools in a large eastern city in 1965-66 and were collected by the USOE's Survey of Educational Opportunity. Separate analyses were to be carried out for black and for white students. A two-stage least-square, or limited information, estimator was to be used. The relative effects of the various inputs were to be related to their prices to obtain a least-cost combination of inputs for each of the measured outputs. The principle policy focus was to be on teacher selection and training.

backgrounds are probably less important direct determiners of academic achievement than has been reported in earlier studies. Tentative interpretations were that teachers' degree level showed no significant relation with students' verbal score, while teachers' experience was strongly related to it. While the direct effect of such a family background characteristic as family size on verbal achievement is large by the single-equation approach, it really reflects the operation of student attitude as an intervening variable when studied by the two-stage least-squares approach. Thus student attitudes play a larger part in determining the level of academic achievement. The model and some tentative interpretations of its results were reported in R&D Memorandum No. 63, "A New Model of School Effectiveness," by H. M. Levin.

ming. Finally, the work will be extended into cost-effectiveness analysis so as to yield policy recommendations for maximizing the impact of additional expenditures.

Program 04: Teaching Students from Low-Income Areas

PROGRAM OBJECTIVE:

To improve the effectiveness of teachers in motivating, engaging, and fostering the achievement of students from low-income areas.

1970 OBJECTIVES

This program, previously the program on Teaching the Disadvantaged, emphasized the contextual factors that affected teaching and learning in poor and minority communities and sought to improve the effectiveness of teacher-student interaction in such communities. The involvement of community organizations and parents in the educational effort was recognized as helpful in improving children's school performance and attitudes. The teacher was seen as directly involved in extra-school influences both in contacts with the community and in interaction with students.

Prior work elsewhere has dealt with instructional programs and only slightly with programs helpful to teachers in confronting these contextual factors which surround the specific instructional act, such as the relationships between community and school and between the dominant white community and the minority sectors of the population.

Specific objectives were to study the impact of community conflict and antagonism upon the

1970 ACCOMPLISHMENTS

The program has nearly completed a manual on educational community organization, collected data on citizen access to public school information, published interviews with black high school students, shown that the ability of teachers to relate to students is likely to vary substantially as a function of the ethnic background of the student group, and evaluated a summer institute for teachers in a black community's elementary school system. Further, the program developed information concerning types of nonstandard English characteristic of minority group students, explored problems in applying foreign language teaching methods to the teaching of standard English as a second dialect, and presented a guide for such teaching with sample microlessons. Also, the program explored the possibilities of helping minority-group students by having them teach younger students and explored the problems of using small groups for such instructional purposes. Techniques were developed for encouraging and training small groups to identify and solve

ASSESSMENT OF 1970 ACCOMPLISHMENTS

In general, the accomplishments of this program in 1970 were substantial but unintegrated. Each of the projects made a significant contribution in its own right, but the sum of these contributions thus far does not constitute an integrated attack on the problem area.

During the spring and summer, recognition of this shortcoming of the program led to planning which eventuated in a substantially more integrated and more development-oriented program.

teaching process, the access of the citizen to the school, specific teaching problems such as bilingualism, the effectiveness of small group principles in classroom management, and the application of research knowledge in teacher training programs. The information and products yielded by the research and development program were to be disseminated through manuals, videotapes, audiotapes, and reports, to audiences including teachers in-service and graduate students in training.

specific problems in schools experiencing crises in human relations. The use of small group interaction in teacher education courses was also explored. A search of the literature on teacher training programs for disadvantaged schools proved relatively fruitless in revealing any procedures distinctively suitable for such programs. Finally, the impact of computer-assisted instruction on the noncurricular dimensions of children's behavior was explored.

Project 0401: Educational Community Organization

The objective of this project was to prepare a manual that would help low-income communities participate in formulating the policies and educational programs of their schools and to identify and help remove barriers to communication between the school and community.

A manual on educational community organization was completed in draft form and has been distributed for internal review, editing, and rewriting as necessary. The manual is based on extensive logs, videotapes, and other records developed by the staff in serving as participant observers in a minority-group community near Stanford.

The manual places greater emphasis on the roles of teachers serving in affluent, dominant, white communities and not just those in low-income areas. It is intended for the typical teacher or future teacher. Rather than encouraging white, middle-class teachers to assume major organizing responsibilities in minority communities, it will attempt to provide teachers with ideas for community work in their own subculture — work that would help bring about improvements in schools serving minority children. The manual will deal with the analysis of local education systems, strategies for change, and, finally, functions and skills, tactics, man-

The manual is expected to help prepare teachers and interested citizens in effecting educational changes responsive to the needs of their communities.

A subproject was to generate data on citizen access to public school information.

Another subproject collected statements from students concerning their views as participants in school systems. Interviews were conducted to ascertain the feelings and attitudes of students.

Another subproject studied the behavior of teachers that facilitates their ability to relate to both black and white students. High school students, 50 black and 50 white, viewed and rated videotapes of 50 white teacher interns on their ability to relate and on seven characteristics of teaching style.

Still another subproject was aimed at evaluating an EPDA-sponsored summer institute for teachers serving in a community-controlled black community's elementary school system. Both attitudinal and informational measures were to be obtained.

agement, and legal aspects of community organization.

Data on citizen access to public school information are almost entirely collected. Private citizens were asked to collect copies of their school districts' Title I Compensatory Education Proposals. The results document the barriers erected by school systems against citizens' influence on education.

Research and Development Memorandum No. 59, R. W. Heath and L. Roy, "Interviews with Seven Black High School Students," December 1969, has been published. It transmits the experience of the students directly to the reader without analysis or interpretation by adult professionals.

The ability of teachers to relate to students is likely to vary substantially as a function of the ethnic background of the student group. Characteristics of teaching style that contribute to ability to relate are different for black students than for white students. See R. W. Heath, "The Ability of White Teachers to Relate to Black Students and to White Students," Technical Report No. 10, February 1970.

On a teacher-attitude inventory, the EPDA group showed less racist attitudes after the institute and was less racist than the comparison group, but the differences, though statistically significant, seemed small. A semantic differential technique indicated moderate changes in the teachers' conceptual structures of "race," "white," and "western civilization." Tests of information gained from six insructional units on black experience in literature, racism and prejudice, history of the civil rights movement, etc., showed substantial and significant superiority for the institute group over the comparison group.

This subproject represents an uncommon and relatively rigorous evaluation of a teacher-education effort concerned with education for low-income students in minority communities. Its procedures, instruments, and findings can be used wherever such teacher-education efforts — devised and administered, like this one, by black educators for teachers working in a district governed by an all-black school board and a black superintendent — are carried out.

Project 0402: Teacher Training: Standard English as a Second Dialect

The objective was to analyze details and methodology of reading standard English as a second dialect. The first group to be examined were to be Mexican-Americans. The project will also study the overt contrast between standard and nonstandard speech as an instructional variable. A syllabus on teaching standard English as a second dialect was to be completed before March 30, 1970. After the project leader's sabbatical leave, i.e., beginning in September 1970, the project was to emphasize cognitive effects of bilingualism, especially on reading problems.

A second subproject sought to identify specific linguistic constraints contributing to children's deficits in standard English and their interaction with the student's age, sex, and native language. Of the 226 students in grades 1, 3, 5, 7, and 9, 84 spoke Spanish, and 142 spoke English. The subjects took tests of auditory discrimination and ability to perceive phonological, morphological, and syntactical elements of standard English. The auditory discrimination test had pairs of nonsense items, of which 24 were neutral for native speakers of English and Spanish, eight were English based, and eight were Spanish based.

Information was gathered concerning types of nonstandard English characteristic of black speech and of interference from Spanish. These findings were reported in Research and Development Memoranda No. 46, "Standard English and Nonstandard Dialects: Phonology and Morphology," June 1969, and No. 54, "Standard English and Nonstandard Dialects: Elements of Syntax," October 1969, by R. L. Politzer and D. E. Bartley. Because some of the differences cut across different languages, the methodology of foreign language teaching may have value in teaching standard English as a second dialect. This possibility was discussed in Research and Development Memorandum No. 40, "Problems in Applying Foreign Language Teaching Methods to the Teaching of Standard English as a Second Dialect," by R. L. Politzer, December 1968. The role of the native language, the definition of "standard," special factors affecting the student, teaching methodology, and teacher training were considered. Finally, a guide to procedures for teaching standard English as a second dialect and sample microlessons were presented in Research and Development Memorandum No. 61, "Teaching Standard English as a Second Dialect: Suggested Teaching Procedures and Sample Microlessons," by R. L. Politzer and D. E. Bartley, March 1970. These techniques draw on those described in Technical Reports Nos. 1 and 1A issued earlier by the Center.

The neutral tests yielded no significant differences due to sex or language background. The English-based section showed native speakers of English performing better, while the reverse was true on the Spanish-based section. Spanish-speaking third and fifth graders

The various memoranda will be revised and incorporated in a syllabus for the training of teachers of standard English as a second dialect — teachers of children from Negro and Spanish (Mexican) subcultures who speak nonstandard dialects.

The work thus far has laid the basis for the development of serviceable diagnostic instruments. Such instruments will be useful in developing teaching techniques and materials for students with specific problems in reading and other language skills.

out-performed their English-speaking counterparts, while the reverse was true for first and seventh graders. In the other tests, a measure of dialect sensitivity or awareness showed improvements with maturation, English-speaking subjects better on morphology and syntax, Spanish-speaking subjects better on phonology.

Project 0403: Developing Problem-Solving Skills Through Students Teaching Students: Use of Small Groups

This project, designed to develop problem-solving skills in disadvantaged students, was aimed at examining the effects of a learning-by-teaching treatment (sixth graders teaching first graders) on the sixth graders' ability to solve problems. Observations in two sixth- and two first-grade classrooms were made, and the sixth graders were tested on problem-solving aptitudes. Then, an experimental group of subjects was given small-group training in problem-solving tasks. Posttests showed the experimental subjects higher than the controls on four skills: problem sensing, problem defining, generating alternative solutions, and foreseeing consequences; but the difference was significant only for problem defining. Role diversification was not greater within the experimental groups, but their product quality was higher. Data were also collected on two criterion tasks, using a model sixth-grade classroom to test students' problem-solving skills. One of these tasks was unstructured; the other, more structured.

A group problem-solving task was also administered, with post-task interviews of each

Problems in developing cohesive groups required so much staff and student attention during the year that the tutoring of first graders by sixth graders became a secondary concern. A slide and audiotape description of the project was prepared.

As compared with control subjects, the experimental subjects performed nonsignificantly better on the individual criterion tasks but not on the group problem-solving variables of participation satisfaction and role diversification. The experimental groups received significantly higher quality-of-product ratings for group interaction, but not for safety, utility, and aesthetic appeal.

The following products are nearly finished: a model classroom task and examiner's manual; a playground construction task and examiner's manual; a curriculum guide for training tutors in the group situation; and a final Technical Report. Completed products include an unpublished doctoral dissertation (Stanford University, January 1970) by J. V. Ramirez, "Effects of Tutorial Experiences on Sixth Graders."

The project seems to have been overambitious. Limitations of time, student readiness, and administrability prevented successful development of supportive, inquiry-oriented groups for studying problems in tutoring first graders. Nonetheless, many students changed positively in attitude and behavior, and impressionistic evidence suggested highly favorable effects on the attitudes of the lower-ability sixth graders.

The project revealed several problems in using small groups for instructional purposes: providing enough time for the treatment, designing the content of group experiences provided in the treatment, and improving procedures for selecting students for tutoring. The results should be useful in the further work of Programs 04 and 05 on dyadic teaching situations, as projected for FY 1971.

subject as to his satisfaction with the group's operation and product, and his perceptions of his group's members and rationale.

Project 0404: Use of Small Groups in a Changing School

To develop techniques that will encourage and train small groups to identify and solve specific problems in a racially tense school, small groups were formed representing, separately, parents, teachers, administrators, and students. The groups met separately, identified factors to be considered in solving the social problem and sought ways of coping with resistance to change, and the like. Data were collected on the various groups' interaction styles, and these were to be analyzed to determine the effectiveness of strategies in resolving conflict.

Subsequently, a similar enterprise, a three-day workshop for teachers and administrators, was carried out in Florida; its 15 leaders were given 2.5 hours of initial training and then worked with 140 teachers and principals from 47 schools, the leaders receiving added training at the end of each day.

Over half of the leaders were able to improve their group's problem-solving strategies. Interest in continued meetings and attempts to use the approach were evident. A Research and Development Memorandum reporting on these activities and their outcome, and other similar ones, is being prepared; also, two dissertations will report experimental tests of various aspects of the problem-solving model, namely, the interpersonal interactions of the group members and the interpersonal perceptions of the participants. A manual of materials for use in problem-solving work in crisis situations is being prepared, along with a package of materials for counsellors interested in group work with seriously disturbed students.

Although the 1970 accomplishments are not yet fully reported, it is highly likely that they will be useful in subsequent efforts in this program to improve the functioning of teachers of students from low-income areas. The model should also have implications for the work of Program 03 insofar as efforts to change school organization and introduce teacher evaluation programs will require problem-solving techniques for use by groups of teachers and administrators. The project will continue toward completion during the first half of FY 1971. The departure of the project leader in July 1971 will require restaffing if further work on problem-solving group processes is to be conducted. At present, program plans call for deferring a decision on this question until work on other projects in Program 03 has moved further along.

Project 0405: Small Group Interaction

To study the use of small groups in assessing the learning experience of students in a professional education course — a course on the application of social interaction theory to a

The project's research findings and developmental effort are soon to be presented in an R&D Memorandum. It will deal with the students' receptivity to a different process of teacher

Work on the project is proceeding on schedule and should be completed by July 1971. The outcomes of the project may be useful in all three of the Center's programs as approaches to

classroom—students participated in groups that involved them in pairs and in small- and large-group settings. The activities were assessed by the students through systematic observations, through ratings of individual's and groups' performances by the instructor, and through journals kept by the students on their experiences and reactions.

training, the difficulties and pressures experienced by the students as they became involved in this course, and the sequencing of activities needed to permit this kind of teaching to be effective. The materials developed for the course will be packaged for use in in-service and preservice training in ways of using small-group concepts in new curricula.

training for heuristic teaching, for teachers of students in low-income areas, and for teacher-administrator teams planning school reorganizations. Further work on the project will be deferred, however, until work in the other three programs has moved further along.

Project 0406: Teacher Training Programs for Disadvantaged Schools

To describe the special skills, attitudes, and behavior needed by teachers of disadvantaged students and the techniques used in teacher training programs to prepare such teachers, plans were made to interview faculty members in ten such teacher education programs, to prepare an outline for evaluating and identifying problems in such training programs, to observe the training of teachers of the disadvantaged, conduct interviews, and prepare a preliminary report. The project was intended to contribute toward the development of a set of behavioral objectives in teacher training programs and procedures for planning such programs.

A literature search was made to summarize pertinent research results, identify programs for site visits, and direct attention toward salient program components. An interview schedule was devised to gather information from program participants on objectives, processes of trainee recruitment and selection, field work experiences of trainees, and curriculum materials and instructional techniques. It was found that the teaching skills regarded as necessary for working with students from low-income areas were almost exactly the same as those expected of a good teacher of any kind of student. Similarly, the guidelines for participation in educational settings in low-income areas were not always clearly delineated.

The findings on the shortcomings in present programs led to the termination of this project upon the completion of a preliminary report, soon to be issued as an R&D Memorandum. For future research, the project results imply a need to determine the extent to which school problems in low-income areas derive from the social context of the classroom, cultural differences between the school and the community, or learning-style differences between low-income and ethnic children, as against white, middle-class children. Further research should also seek new pedagogic techniques or alter the teacher's role. Accordingly, these findings have been incorporated into the present program on Teaching Students from Low-Income Areas, as designed for FY 1971. Various projects in Programs 03 and 05 are also indicated, by the present findings, as pertinent to future work in Program 04.

Project 0407: The Impact of Educational Technology: A Study of the Computer as a Socializing Agent

To describe the child's image of the computer as a part of the educational system and the differences in this image according to age, sex, socioeconomic status, length of exposure to CAI programs, and the teachers' attitudes toward the CAI programs, data gathering instruments were to be administered to children involved in CAI programs (e.g., arithmetic drill-and-practice programs for junior high school students) in the Bay Area and elsewhere in the nation. Also, interviews were to be conducted with teachers to ascertain their attitudes toward educational technology (especially the computer), their views concerning the persons who determine the kinds of programs introduced into the schools, the impact of such programs on the role of the teacher, their comfort or discomfort in having the computer available as a teaching resource, etc. This project, formerly a part of the Center's Nonprogrammatic effort, was incorporated into Program 04 because of the frequent use of computer-assisted instruction in teaching students from low-income areas.

A questionnaire and interview schedule, based on unstructured interviews and observation of students learning from CAI, were pilot tested and then used to collect data from 189 junior high school students, of whom 50 had been assigned to CAI. Interviews were conducted with 10% of the students, who were predominantly Mexican-Americans from homes of lower socioeconomic status. The differences in responses to questionnaire items between CAI and non-CAI groups were greater than those associated with sex, grade level, ethnicity, socioeconomic status, and intelligence test score differences. Both CAI and non-CAI students had very positive images of CAI's likability, trustworthiness, access to much information, and fairness, and attributed an almost human role to CAI. It was regarded in some respects as superior to the teacher. But the CAI students were more aware than their non-CAI peers of the computer's unresponsiveness to student's eventual desires to change the course.

Technical Report No. 13, "The Computer as a Socializing Agent: Some Socioaffective Outcomes of CAI," by R. D. Hess, M. D. Tenezakis, et al., was published in October 1970. A revised version of the questionnaire for students, now being developed, will be useful for comparing images of the computer and CAI, as against other sources of information and instruction, with respect to expertise, trustworthiness, attractiveness, charisma, and responsiveness to student attempts to change the content and format of lessons. An interview schedule for obtaining teachers' attitudes toward computers as used in education, and in CAI particularly, is being developed.

The project's findings have implications for the further development of CAI and its uses in schools and for the analysis and evaluation of teacher behavior. These implications have been considered in the planning of several projects in Programs 04 and 05, especially those dealing with dyadic teaching situations. Other studies are now under way to investigate the motivational characteristics of CAI, the effect of explanations about the computer on images of CAI, the impact of CAI experience on attitudes toward the computer, and the effect of CAI experience on the student's self-concept.

Program 05: Heuristic Teaching

PROGRAM OBJECTIVE:

To define, analyze, and develop means for promoting heuristic teaching and learning in schools.

1970 OBJECTIVES

To define heuristic teaching functions in education, to understand the psychological processes of heuristic teaching and learning, and to develop means of promoting heuristic teaching and learning in schools, this program has undertaken a series of basic research studies and developmental projects, the latter taking the form of training programs, clinics, institutes, and more recently, manuals and materials for training purposes.

1970 ACCOMPLISHMENTS

During the past year, five projects have operated within the program, as described below. In addition, two program-level activities were carried out: a survey of many commercially available teacher training materials, and a symposium on the definition of heuristic teaching in which education faculty members participated by writing papers from the standpoint of their content specialties, philosophy, or psychology.

ASSESSMENT OF 1970 ACCOMPLISHMENTS

The overall outcome of these integrated studies is to lay the basis for the further research and developmental work outlined in the 1970 Program Plan and Budget Request. The program seems to be developing sufficient maturity to support the effort to develop a model teacher training system, as outlined in the Program Plan.

Project 0501: Training Studies

Reports were to be prepared on previously completed pilot studies on teacher differences in student aptitude-achievement relations and on supervisory classification of teacher classroom behavior. Two other investigations of teacher-learner interaction and higher-order question sequencing were scheduled for completion during the first half of FY 70. The results of three

Technical Report No. 8, "Microteaching and the Technical Skills Approach to Teacher Training," by David C. Berliner, summarized past Center research on microteaching. A companion report by Berliner, entitled, "Manual for the Use of Technical Skills in a Microteaching Clinic," should be completed during the coming months. A Research and Development Memo-

The training studies have particularly achieved a level of insight into the Q-E-L trio of skills (questioning, explaining, and listening) that should make possible substantially more sophisticated research attacks on the determiners of their effectiveness and the ways of improving them.

studies of the audiotape listening program were to be reported, with recommendations for revision of the program. The Minicourse study begun in collaboration with the Far West Laboratory was scheduled for completion, and reporting. Further, studies of teacher-learner dialogue as it develops over a number of sessions and of the interaction of teaching and learning variables in such situations were to be conducted. These studies were intended to yield definitions of new heuristic teaching skills and ideas for appropriate training procedures, rules for assigning students to different teachers or subgroups, and bases for the design of computer simulations of inquiring students for use in teacher training. Finally, a new study, "How to Explain: A Manual to Improve Performance on a Micro-Criterion of Teacher Effectiveness," was to be undertaken; it was intended to develop and test experimentally a printed manual and course of study.

randum, "A Survey of Microteaching in NCATE-Accredited Secondary Education Programs," by Blaine E. Ward was published in December 1970.

Research on questioning skills is being summarized in two Technical Reports: recent work has developed classifications of teacher-learner behavior, particularly as related to questioning skills. Another study has developed methods for studying sequences of question-answer interchanges between teacher and student in microteaching situations and should provide analyses of question-sequencing patterns.

Research on listening has investigated an audiotape listening program for teacher training; it showed that, despite striking improvements on the tests accompanying the programmed materials, effects on teacher behavior in classrooms were slight. A study of teachers' use of student comments in their subsequent remarks failed to achieve adequate levels of rater agreement. An experiment on the use of photographic feedback to promote accurate teacher perception of student attending behavior yielded significant improvement and also showed that observed student attending was significantly higher in classes where teachers perceived attending behavior more accurately.

Studies of aptitude-treatment interactions found interaction between some trainee aptitudes and videotape versus written-transcript models of analytic questioning skill and also an interaction between trainee aptitude and the presence or absence of a supervisor during viewing of a videotape model of higher-order questioning skill. Other studies suggest that aptitude-achievement regression slopes for classes be used in addition to class averages to reveal differences in teacher style and effectiveness.

The studies of explaining skills took two forms: the development of a test of effectiveness in explaining, which was still in its formative stages because of difficulties in developing scoring schemes, and the development and experimental tryout of a manual for improving teacher effectiveness in explaining. The latter resulted in significant differences between experimental and control groups of trainees as measured by both adjusted and unadjusted mean posttest ratings of the overall quality of their explanations. Further analysis is attempting to determine whether the overall improvement reflects the effect of the specific variables in explaining behavior that the manual was intended to improve.

Teacher-learner dialogue situations were investigated in a tutorial laboratory situation in which the details of cognitive and effective interaction between teacher and learner could be studied intensively over a sequence of meetings or lessons. A pilot investigation, using four teachers tutoring each of four students in introductory physics material for one hour per day for five days yielded pre- and posttest data on achievement and constrained association tests, foresight-hindsight diaries kept by the teachers from day to day, and transcripts of each dialogue itself. Preliminary analyses suggest that the technique has substantial value for revealing training effects on learning and for examining "learning-to-teach" effects.

Project 0503: Microteaching and Intern Data Bank

Budgetary limitations required limiting the objectives for FY 1970 to the examination of correlations between teacher selection data and the length of time an intern remains in the teaching profession and students' attitudes toward the intern. It was necessary to postpone the installation of a computer terminal, the further review and classification of videotapes in the videotape library, the initiation of a five-year longitudinal study of trainees of the Stanford Teacher Education Program, and research and development on a crisis laboratory curriculum.

Intern data bank information was stored in Stanford's computer for easier retrieval and cross-referral of much information on each of the interns. A supervisor questionnaire to provide data on interns' supervisors was developed and used to collect data from the most recent class of interns; these data are currently being analyzed. A career patterns study was conducted by a telephone interview survey which reached about 95% of the approximately 1,000 graduates since 1959 to obtain information concerning their occupations in education and their evaluations of the preservice training program in the light of their subsequent experience. Results showed 43% still engaged in secondary teaching, another 24% in other kinds of teaching or related work, and 33% in noneducational occupations.

The videotape training and research library began to be catalogued according to teaching variables exhibited, such as "use of reinforcement," to make possible selection of tapes for specific purposes in training or research, but the indexing was severely restricted for lack of funds.

Microteaching studies dealt with teacher responsiveness, "personal" as against "content"-oriented leadership styles of interns, the use of verbal and symbolic as against graphic representations in teaching mathematics, and the effectiveness of an experimental program in techniques of solving problems in groups and making interns regard their training as relevant and in helping them receive favorable student ratings.

The project also conducted two one-week workshops, each with 40 participants, on new

Despite severe budgetary limitations, the project has continued to exploit the potentialities of microteaching as a tool for research and training. Skill in the use of this tool has reached a level capable of making feasible this aspect of the development of the model teacher training system outlined in the Program Plan. The library of videotapes will be especially useful in developing that system if funds for cataloging and follow-up studies of interns become available. Although microteaching is being adopted more and more widely, definitive studies of its long-range effects and short-range results in student learning are nonexistent.

Project 0504: Uncertainty Studies

To study and develop the skills and materials required to improve teaching for reflective thinking, and to carry the work beyond the previous studies of teaching techniques and instruments for assessing relevant teaching styles and student abilities, a year-long Institute on Teaching for Reflective Thinking was established, with support from an EPDA grant. The research and development objectives were to develop instruments to assess reflective thinking, evaluate the growth of reflective-thinking ability in students of Institute participants, to work with individual Institute teachers to examine their teaching and curricular problems, continue analysis of learning and problem-solving situations and the required models of intellectual processes, work with curriculum consultants, and document teacher behavior related to the growth of student abilities.

approaches to teacher training; aimed at administrators, supervisors, and experienced teachers, each workshop demonstrated microteaching and strategies for using videotape in instruction and supervision.

Regression analyses were made to determine the extent to which several variables (teacher characteristics, age, socioeconomic class, IQ, ethnicity, family size, birth order, sex, grade level, and scores on tests of warranted uncertainty) predict scores on tests of ability to generate warranted uncertainty.

The behavior of teachers who participated in the Institute, of 35 "control group" teachers and of their respective students was studied with videotapes analyzed to determine the extent to which the teachers and students generated uncertainty in classroom discussions.

Tests of six thinking skills administered to 800 students in grades 4-6 are being analyzed to determine the correlates of ability to generate warranted uncertainty and to evaluate three instructional experiments. The experiments dealt with the role-playing skills of fifth-grade students in problem recognition and hypothesis generation, a series of units on art designed to elicit uncertainty through either cue attendance or hypothesis generation, and procedures for teaching students to distinguish between objective and subjective judgments.

Because the data are still being analyzed, conclusions relevant to the objectives of the project cannot yet be drawn. The various research instruments, such as the system for examining the extent to which teachers and students generate uncertainty in classroom discussions, have been shown to be reliable and relevant to the project's aims. The experience gained in working in this area is already adequate to justify planning of the kind that has entered into the design of the program for FY 71. It is expected that the present undertakings will have been completed and reported by September 1971.

Project 0506: Personal Competencies

First, to develop and evaluate assessment and training procedures for STEP trainees, simulation of teacher problems by videotape or film, classroom behavior schedules, self-report techniques, anxiety-reduction procedures, and competencies development training were to be tried. Follow-up of 35 interns from summer through fall and winter quarters was to be used to determine whether the summer training helped the interns.

Second, training of in-service teachers and counselors in two field settings to improve their personal competencies was to be evaluated in a controlled quasi-experiment.

Third, longitudinal studies of several teaching interns were to be made throughout their 1969-70 training program with observations including self-reports of feelings, observer ratings of behavior, physiological measures, etc. Each intern was to be treated with tailored procedures to increase his personal competencies. Changes in individual performances before and after intervention were to be measured.

Fourth, conceptual, historical, and field studies on the general construct of personal competence were to be presented in a position paper on the rationale and definition of such competence.

Fifth, an experiment in reducing anxiety-stress in volunteer STEP interns was to be conducted, using one of three experimental treatments designed to reduce stress reactions and increase self-control.

Sixth, a study of methods of assessing, altering, and evaluating the personal competencies

The conception of personal competence has been developed in ways that emphasize the individual's response capability and specific actions in problematic situations.

The study of Stanford interns provided each intern with one of four alternative kinds of experience: self-help (N=7), personal interviews with a counselor (N=7), a group behavior seminar (N=10), and a class dealing with crisis situations (N=8). None of the experiences appreciably affected the interns' problem experiences as reported by themselves, observed by trained observers, or elicited in interviews.

The study of six volunteer elementary school teachers, all of whom were black, was conducted to train them in more effective ways of working with their students. The training was intended to increase their physical relaxation in the classroom, to increase their classroom management skills in observing classroom interaction, analyzing classroom problem situations, changing student problem behavior, and increasing students' academic motivation. The results were highly encouraging. Undesirable student behavior decreased significantly for all six teachers, and the teachers experienced greater self-control and an increased sense of competence in dealing with problems. This work also yielded systems for classroom behavior observation, for observing the teacher's nonverbal behavior, and for training teachers in classroom management; these will be presented in a Technical Report.

The study of counselors entailed teaching them skills of behavioral consulting (problem

Brief didactic interventions are ineffective, the intern's immediate behaviors in problem situations should be a major focus of personal competence training, his personal characteristics determine how he deals with classroom problems, and guided practice should be stressed.

The study with counselors demonstrated the feasibility of developing training experiences

of preservice counselors was to be initiated by beginning with techniques for assessing the personal competencies of intern counselors at Stanford and a pilot study in promoting specific competencies. Similar small-scale studies were to be made on the feasibility of personal competency training for parents and prospective school administrators.

definition, data collection, planning, carrying out a change project, and evaluation). Each counselor carried out two consultations with teachers and tried to evaluate their effectiveness systematically. The training made these counselors feel more willing and able to handle teacher requests for help with such problems as increasing frequency of student participation, decreasing disruptive behavior, reducing a student's fear of singing, and increasing the frequency of a teacher's positive statements.

Because of equipment problems and a change in research plans, the measurement of physiological responses of teachers was postponed to the 1970-71 academic year. Current work deals with techniques for improving self-regulation of both external and internal or covert behavior in order to improve self-control in problem situations. Behavioral phychology is being articulated with the goal of humanistically oriented psychologists and philosophers to determine whether learning experiences can be developed to enable individuals, such as teachers and counselors, to interact in more humanistic ways with other persons.

for helping school counselors become more competent in working with teachers.

Overall, the year's record of successes and failures encourages the expectation that behavior modification techniques can be incorporated into a model teacher training system, of the kind planned in Program 05, so as to provide teachers with skills of self- and classroom control necessary to provide the freedom from emotional disruptions that makes cognitive learning at higher levels possible in classrooms.

Project 0507: Effective Reinforcement for Achievement Behaviors in Disadvantaged Children

To identify teaching methods that improve achievement through shaping motivational and belief systems in disadvantaged children, and to delineate training procedures for making teachers better able to develop beliefs in the child that school achievement is personally worthwhile and that he can do something about

The study was conducted essentially as planned. A comprehensive schedule for observing teacher-child interaction in the six third-grade classrooms was devised and used. The data are being analyzed to estimate observer reliability and ranges of frequency of given behaviors, estimate split-half consistency of behavior,

Results from this first phase will be incorporated into training procedures now being planned. During the coming year, one group of teachers will participate in biweekly workshops on the development of effective reinforcement conditions in the classroom, differentially adapted to children's motivational characteristics. Another

such achievement, this project was planned to have three phases extending over a five-year period. For FY 70, pilot work preceding two experimental procedures was to be carried out. All children in six elementary classrooms in a low-income area were to be tested on self-concept, belief in internal control, and sociometric measures. Teacher interaction with all children in the class was to be measured. The six teachers were to rate the children for adjustment to school learning. Eight children were to be selected, one for each of the eight possible combinations of high and low self-concept, high and low belief in internal control, and above or below class median in reading and arithmetic achievement. These eight children were to be observed as to their interaction with the teacher, and anecdotal reports on them were to be obtained from the teacher until the end of the school year, when the children would again be tested on achievement, self-concept, and belief in internal control. The data will be examined as to evidence concerning the teacher interactions that result in desirable growth in the children.

identify teacher behaviors which contribute to gains in achievement and self-concept and beliefs in internal control of reinforcement.

group will participate in an equal number of workshops in the field of science, with no emphasis on shaping motivation for achievement. The effects of the training workshops on both children and teachers will be compared by means of analyses to be conducted during 1972. The results of the analysis will be used as the basis for the development and tryout of training material during 1973-74. Overall, the methods and results of the project will be incorporated into the model teacher training system being planned in Program 05.